Jie Zhou

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EDUCATION

Beijing University of Chemical Technology (BUCT, 211) ***2019.09-2023.06***
Major: Mechanical Design, Manufacturing and Automation
- GPA: 3.72/4.33 (Ranking: 1/153, 0.65%)

Harbin Institute of Technology, Shenzhen (HITSZ, 985, C9) ***2023.09-Present***
Major: Mechanical Engineering (Robotics), MPhil

AWARDS AND SCHOLARSHIP

- First-class Scholarship, **HITSZ** (2024)
- Outstanding graduate of Beijing, **Beijing** (2023)
- Outstanding Competition Scholarship, **BUCT** (2023)
- **National Scholarship** × **2** (top 0.2% in China) (2022, 2021)
- National **Competition Awards** × **3**, **China** (2020-2023)
- Beijing **Competition Awards** × **2**, **Beijing** (2021-2022)
- Li Wen and Yang Yan Scholarship, **Social Fund** (2020)
- Excellent Student ×2, **BUCT** (2020, 2021)

PUBLICATIONS

(Submitted) **Jie Zhou**, Yuan Fang, Yang Chen, Yao Li*, Bing Li*. "Modeling of the constant-current stimuli response of a bio-robot for long-term motion control." 2024 IEEE international conference on robotics and biomimetics (ROBIO). IEEE, 2024.

RESERARCH & ENGINEERING

In HITSZ; State Key Laboratory of Robotics and Systems(Shenzhen)

Modeling of the constant-current stimuli response of a bio-robot for long-term motion control

Advisor**: full prof. Yao Li & full prof. Bing Li;* ***Graduate Researcher; 2024.1 – Present

- This study focused on the two major obstacles in the current development of cockroach robot: habituation and lack of basic model.
- ***Article main work***: two new methods, one new model.
  - Method1: A new surgical method that optic lobe implantation was proposed. It lasted longer 5 times than traditional methods;
  - Method2: A more effective stimuli signal that bidirectional constant-current sign was implemented. My excellent hardware design skills secured the design of constant-current backpack.
  - New Model: stimulated-motion response is the basic movement process of cockroach bio-robots, but it hasn't been quantitatively described by anyone. I modelled it by machine learning approach in conjunction with theoretical extrapolation and validation.
- Hosted all the works, including idea, surgery, hardware, experiments, program and article.

Research on autonomous navigation technology of pipeline bio-robot motion control

Key Technologies R & D Program of Shenzhen

Advisor**: full prof. Yao Li* ***Graduate Researcher; 2023.3-2024.6

- Aimed to develop a bio-robot for pipeline maintenance that enabled navigation, localization and image retrieval.
- A electronic backpack hardware was designed, which consisted of UWB position module, camera module, wi-fi module, DAC module and voltage conversion module with stm32.

- UWB and IMU fusion positioning ensured positioning error not more than 10 cm.
- A yolov5-based image recognition algorithm was developed to pipeline identification and steering. Images were transmitted by ov5640 camera and displayed in the host software written by qt.
- Hosted all the things mentioned above.

Multi-dimensional force sensor based on origami structure

Supervisor**: Gang Liang* ***Research Assistant; 2022.11 -2023.5

- Aimed to create a new lightweight, high-precision sensor, inspired by Origami Configurations.
- 3-DOF Yoshimura Origami Unit Static model was derived to determine the relationship between unitary forces and postures.
- An equivalent circuit was designed and its resonant frequency was obtained by simulation verification. The equivalent inductance was calculated from the resonant frequency.
- Measurement board used stm32 as the main control and LDC1614 as the resonant frequency measurement chip. Then in turn calculated the angle of pinch and the force.
- Responsible for hardware design, fabrication, inductive sensor design(including formulae derivation)

In BUCT

Roll dung beetle - a biomimetic robot with multiple motion modes ***Project leader; 2021.9-2022.5***

- Aimed to develop a bionic robot for exploration and rescue in complex terrain, inspired by dung beetle.
- The robot had two motion mode: crawling and rolling. Its crawling mechanism base on the Crane linkage. The rolling mechanism consistedof two semi-circular supports and the switching between rolling and walking was achieved through a screw nut.
- Done alone all technical content. What I'm most proud is that robot only cost 312.6RMB (HK$338.3).
- **Achievement: China Student Mechanical Innovation Design Competition, 2nd prize in Beijing.**

Ros-based quadruped robot ***Project core member 2020.6-2021.9***

- **Background**: 2020 was the year that quadrupedal robots sprang up in China, we dreamed of making own quadrupedal robot as undergraduates.
- The mechanical design referenced and improved upon Stanford's Puppy. Compared to Puppy, our joint motors were embedded to the inner body, which enhanced robot robustness.
- Rviz simulation and kinematic inverse solutions were used for trot gait planning. Jetson nano equipped with ROS was chosen as control-center. Laser radar built environmental maps with cartographer.
- I done mechanical, assembly and bottom level control, included kinematic inverse solutions.
- **Achievement: *National Training Program of Innovation and Entrepreneurship, China, 2021; The 8th national "Internet+" Innovation and Entrepreneurship Competition, 2nd prize in Beijing.***

National Award Mathematical Modeling Essay ***All served as research leader***

- **An investigation of base station planning problem based on clustering-genetical algorithm.**
  - Achievement: *The 12th Mathorcup Mathematical Modeling Challenge, 1st prize in China,2022 .*
- **Reinforcement Learning with Control Variables Evaluation Algorithm in Canine Sheep game.**
  - Achievement*: Shenzhen Cup National Mathematical Modeling Competition, China (rank16),2021.*

Skills

- **Programming**: C++, Python, Qt, Vb, WeChat small-program development
- **Modeling**: MATLAB, Solidworks, Altium Designer, AutoCAD.
- **OS**: Linux, Ros.
- Won one soccer champion and made it out of the group stage in basketball 2 times.
- **Self-awareness**: I consider myself an outstanding mechanical and hardware engineer, a decent programmer. I do believe that I' m also a good researcher. Thank you for seeing here!